QCBOX

POWER AMPLIFIER, SWITCHING AND TESTING BOX

MODEL 5

USER'S MANUAL

AUDIOMATICA

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1 - THE QCBOX MODEL 5 POWER AMPLIFIER, SWITCHING AND TESTING BOX

The QCBOX Model 5 power amplifier, switching and testing box is of invaluable help in everyday laboratory use and when configuring an automatic or manual quality control setup.

The QCBOX Model 5 has an ultraslim design, enhanced features as USB connection to the PC and DC measuring capabilities with respect to its predecessor model 4, increased power (50W@8Ohm) with respect to its predecessors Model 1, 2 & 3 and wide range AC (90÷240V) power supply. The power amplifier output current is limited under software control.

Its main feature is the possibility of **internal switching**, under software control, that permits the measurement of the impedance and frequency response of the loudspeaker (or D.U.T.) connected to its output sockets without changing the loudspeaker (or D.U.T.) wiring; it is also possible to choose one among four inputs for the response measurements; the internal switching is controlled via a USB port of the PC. The inputs 3 and 4 can be also configured to measure DC voltages with range ±2.5V and ±5V respectively.

An internal software controlled voltage generator can superimpose a DC voltage (±20V) to the amplifier voltage output, allowing for loudspeaker large signal parameters measurement.

A dedicated output, ISENSE, allows impedance measurements in constant voltage mode as well voice coil current distortion analysis. The ISENSE DC current is measured in a range ±2.25A.

A dedicated input, PEDAL IN, permits an external foot pedal switch or TTL signal to be connected and trigger QC operations.

A DB25 connector on the rear panel feature 5 digital IN and 6 digital OUT.

2 - TECHNICAL SPECIFICATIONS

Inputs:	Four line/microphone inputs with selectable phantom power supply (0÷24V software controlled) TTL pedal input (RCA connector)
Digital I/O:	5 digital inputs (DB25 connector) 6 digital outputs (DB25 connector)
Power output stage:	50W (8Ohm) power amplifier (26dB gain) with current sensing and software controlled current limiter Capability of superimposing a DC voltage (±20V)
THD (@1 kHz):	0.004 %
Functions:	USB controlled internal switches for impedance measurements Isense DC current measurement ±2.25A DC IN measurement (IN 3 range ±2.5V, IN 4 range ±5V)
Dimensions:	23(w)x23(d)x4(h)cm
Weight:	1.4kg
Power supply:	150W 90÷240VAC

3 - GENERAL CONDITIONS AND WARRANTY

THANKS

Thankyou for purchasing your QCBox Model 5. We hope that your experiences using QCBox Model 5 will be both productive and satisfying.

CUSTOMER SUPPORT

Audiomatica is committed to supporting the use of the QCBox Model 5, and to that end, offers direct support to end users. Our users all around the world can contact us directly regarding technical problems, bug reports, or suggestions for future software enhancements. You can call, fax or write to us at:

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PHONE: +39-055-6599036
FAX: +39-055-6503772

AUDIOMATICA ON-LINE

For any inquiry and to know the latest news about the QCBox Model 5 and other Audiomatica's products we are on the Internet to help you:

AUDIOMATICA website: www.audiomatica.com
E-MAIL: info@audiomatica.com

AUDIOMATICA'S WARRANTY

Audiomatica warrants the QCBox Model 5 against physical defects for a period of **one year** following the original retail purchase of this product. In the first instance, please contact your local dealer in case of service needs. You can also contact us directly as outlined above, or refer to other qualified personnel.

WARNINGS AND LIMITATIONS OF LIABILITY

Audiomatica will not assume liability for damage or injury due to user servicing or misuse of our product. Audiomatica will not extend warranty coverage for damage of the QCBox Model 5 caused by misuse or physical damage. Audiomatica will not assume liability for the recovery of lost programs or data. The user must assume responsibility for the quality, performance and the fitness of Audiomatica software and hardware for use in professional production activities.

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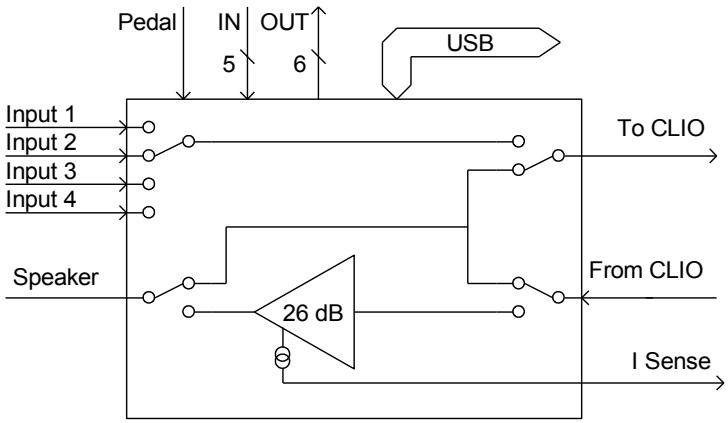
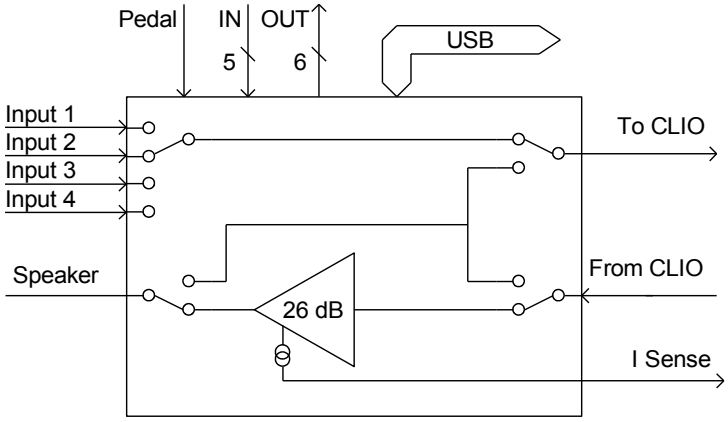
4 - INTERNAL FUNCTIONAL DIAGRAM

The first diagram shows us the unit set for **impedance** measurements (in **Internal Mode** referring to CLIO software, see chapter 13 of the User's Manual); in this situation the power amplifier and inputs are disconnected while the speaker load is presented in parallel with CLIO's input and output; this method of impedance measurement relies on the precise knowledge of the analyzer's output impedance and stimulates the D.U.T with signals of small amplitude.



Internal connections for impedance measurements (Internal Mode)

The second diagram shows us the unit set for **frequency response** measurements; in this situation CLIO's output is fed to the power amplifier that drives the speaker under test while one among four inputs is directed to CLIO's input.

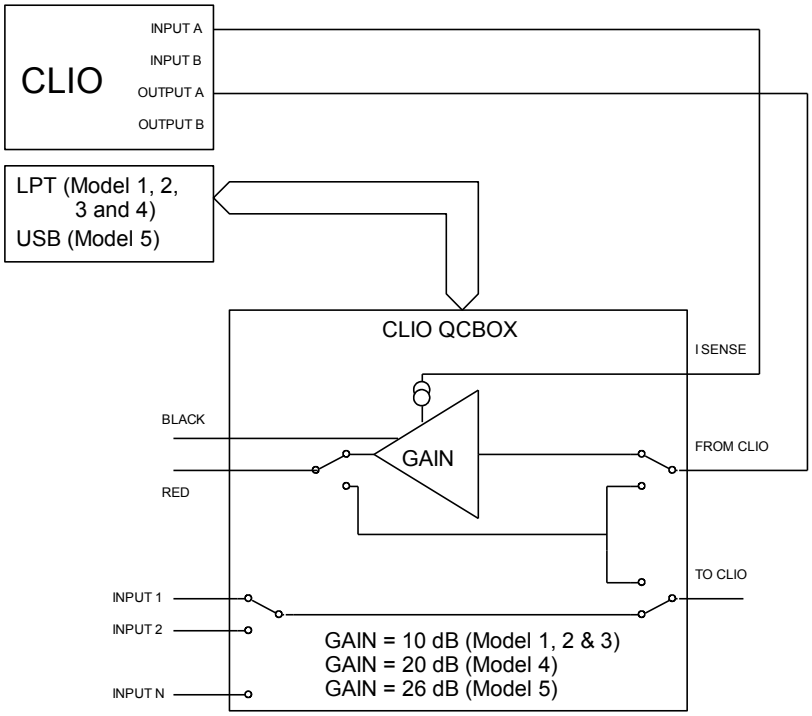


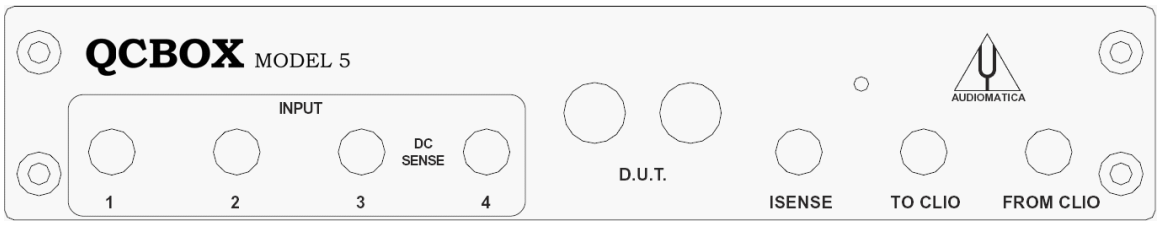
Internal connections for frequency response measurements

NOTE: when the unit is set for frequency response measurements it is possible to measure the current flowing in the D.U.T. through the **ISENSE** output; this permits impedance measurements stimulating the D.U.T. with signals of variable amplitude up to the amplifier's maximum power or voltage. Refer to chapter 13 of the CLIO User's Manual.

5 - BASIC CONNECTIONS

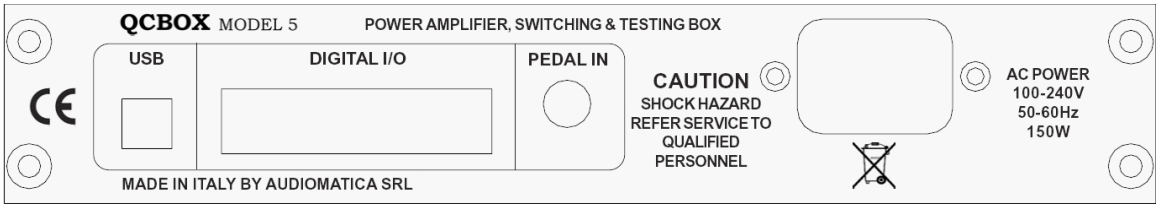
The following diagram shows the basic connections needed to operate the unit.





Please connect (referring to the front panel):

1) A pin-to-pin cable from the "From CLIO" RCA plug to CLIO's output.
2) A pin-to-pin cable from the "To CLIO" RCA plug to CLIO's input.



Please connect (referring to the rear panel):

3) An USB cable from the USB plug to a free PC USB port.
4) A standard IEC AC cord in the AC Power receptacle.

There is no mains switch. Now you can plug the AC cord in the wall outlet and verify the lighting of the front panel LED.

6 - DEFAULT INTERNAL SETTINGS

The QCBox Model 5 can be operated also if the USB cable is not connected to the PC.

In this particular case, when software control doesn't take place, the unit operates in the following mode:

Internal setting: frequency response.

Input: enabled input 1.

I SENSE: enabled.

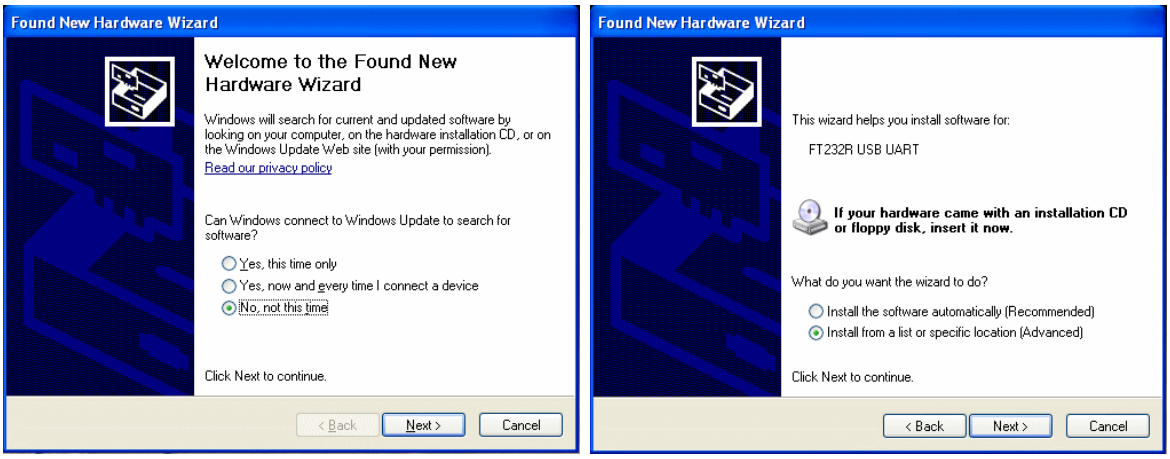
Current protection limiter: 2 A.

7 - USB DRIVER INSTALLATION

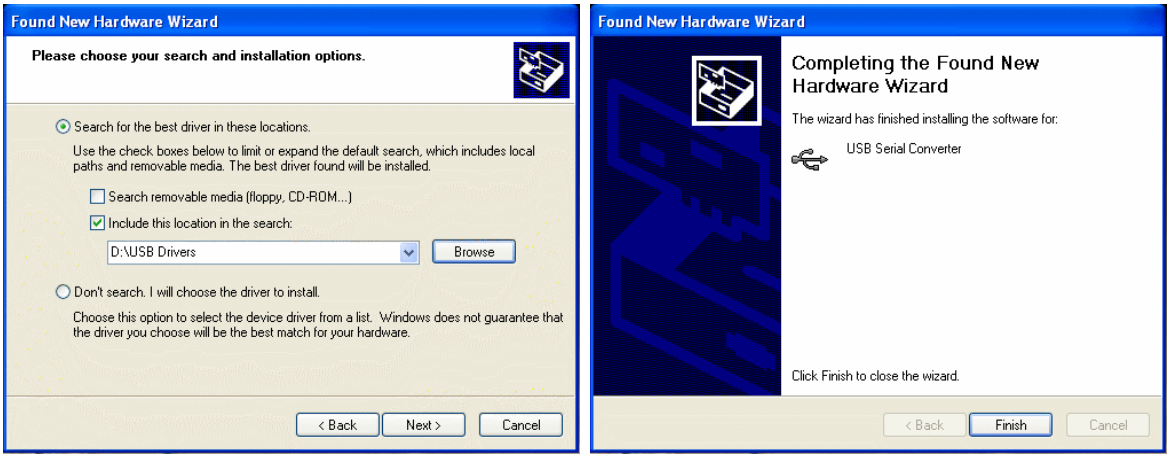
When connecting the USB cable to the PC and the QC Box it may be requested by the operating system to install a device driver.

Install driver under Windows XP

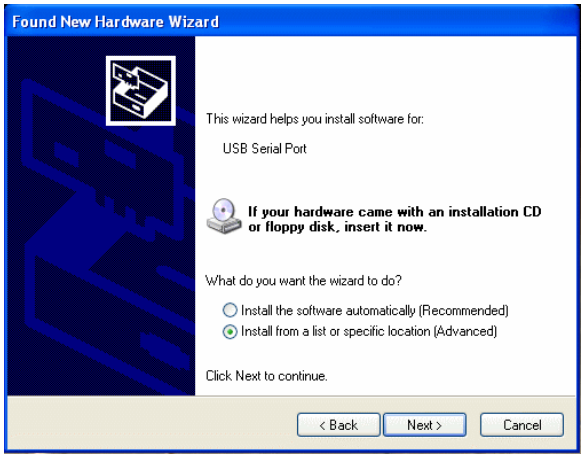
You will be prompted with the dialog boxes in next figure. Select 'No. Not this time' and then select 'Install from a list or specific location (Advanced)'.


Found New Hardware Wizard
Welcome to the Found New Hardware Wizard
Windows will search for current and updated software by looking on your computer, on the hardware installation CD, or on the Windows Update Web site (with your permission).
Read our privacy policy
Can Windows connect to Windows Update to search for software?
Yes, this time only
Yes, now and every time I connect a device
No, not this time
Click Next to continue.
< Back
Next >
Cancel
Found New Hardware Wizard
This wizard helps you install software for:
FT232R USB UART
If your hardware came with an installation CD or floppy disk, insert it now.
What do you want the wizard to do?
Install the software automatically (Recommended)
Install from a list or specific location (Advanced)
Click Next to continue.
< Back
Next >
Cancel

At the successive prompt Select 'Search for the best driver in these locations' and press the 'Browse...' button. Choose the **'USB Drivers'** folder inside the CLIO CD-ROM .It will be installed the **USB Serial Converter**.


Found New Hardware Wizard
Please choose your search and installation options.
Search for the best driver in these locations.
Use the check boxes below to limit or expand the default search, which includes local paths and removable media. The best driver found will be installed.
Search removable media (floppy, CD-ROM...)
Include this location in the search:
D:\USB Drivers
Browse
Don't search. I will choose the driver to install.
Choose this option to select the device driver from a list. Windows does not guarantee that the driver you choose will be the best match for your hardware.
< Back
Next >
Cancel
Found New Hardware Wizard
Completing the Found New Hardware Wizard
The wizard has finished installing the software for:
USB Serial Converter
Click Finish to close the wizard.
< Back
Finish
Cancel

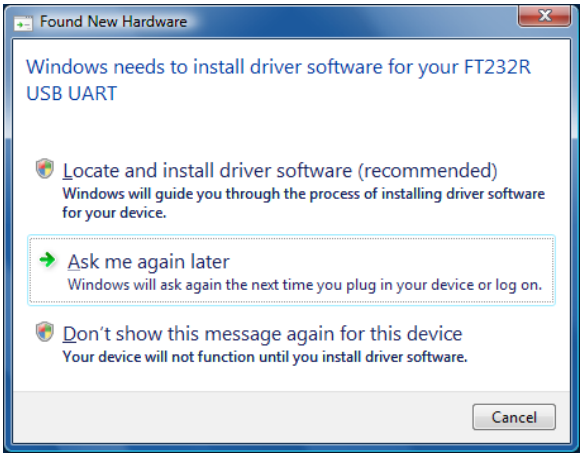
You will be prompted again to install the second USB device: repeat the same procedure to install the **USB Serial Port**.


Found New Hardware Wizard
This wizard helps you install software for:
USB Serial Port
If your hardware came with an installation CD or floppy disk, insert it now.
What do you want the wizard to do?
Install the software automatically (Recommended)
Install from a list or specific location (Advanced)
Click Next to continue.
< Back
Next >
Cancel

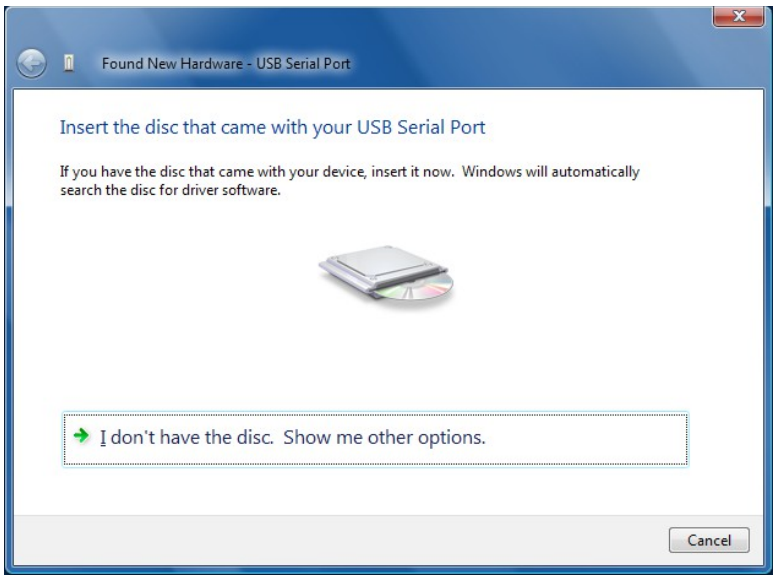
Windows drivers installation is now finished and your QCBOX Model 5 system ready to be used.

Install driver under Windows Vista

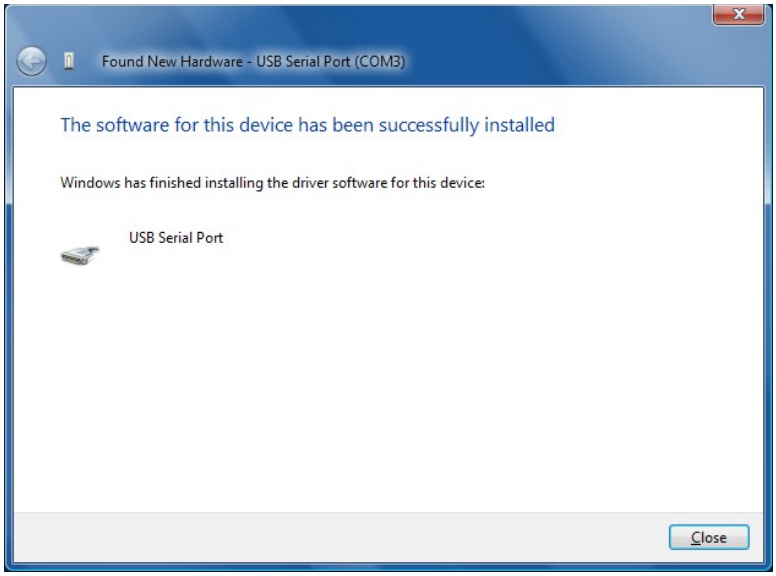
You will be prompted with the dialog box in next figure. Select 'Locate and Install Driver'.


Found New Hardware
Windows needs to install driver software for your FT232R USB UART
Locate and install driver software (recommended)
Windows will guide you through the process of installing driver software for your device.
Ask me again later
Windows will ask again the next time you plug in your device or log on.
Don't show this message again for this device
Your device will not function until you install driver software.
Cancel

Vista will connect to the Windows Update site trying to download the driver. If it fails or if an internet connection is not available it will ask for a device driver CD.


Found New Hardware - USB Serial Port
Insert the disc that came with your USB Serial Port
If you have the disc that came with your device, insert it now. Windows will automatically search the disc for driver software.
I don't have the disc. Show me other options.
Cancel

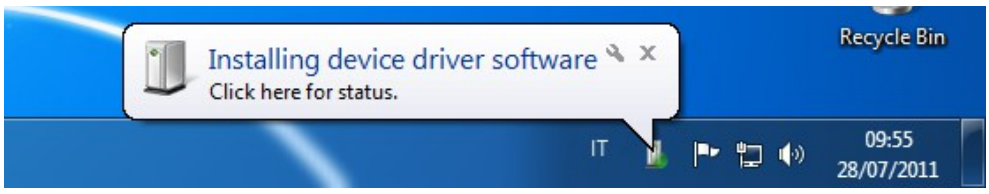
Please insert the QCBox 5 CD ROM, the drivers will be automatically found and installed.


Found New Hardware - USB Serial Port (COM3)
The software for this device has been successfully installed
Windows has finished installing the driver software for this device:
USB Serial Port
Close

Windows drivers installation is now finished and your QCBOX Model 5 system ready to be used.

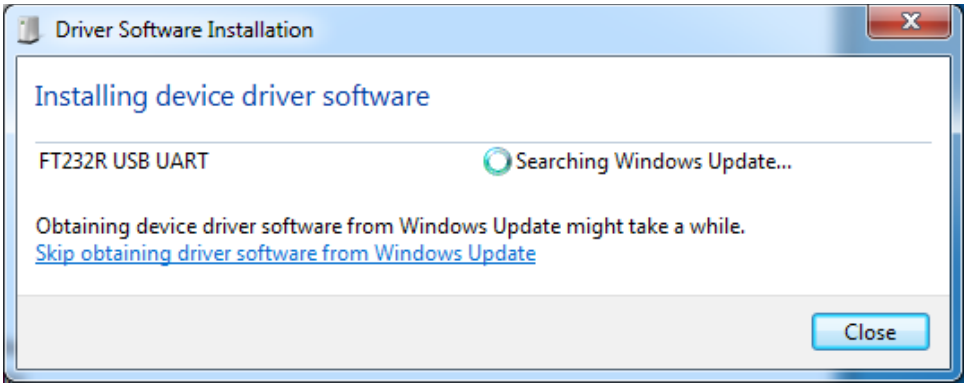
Install driver under Windows 7

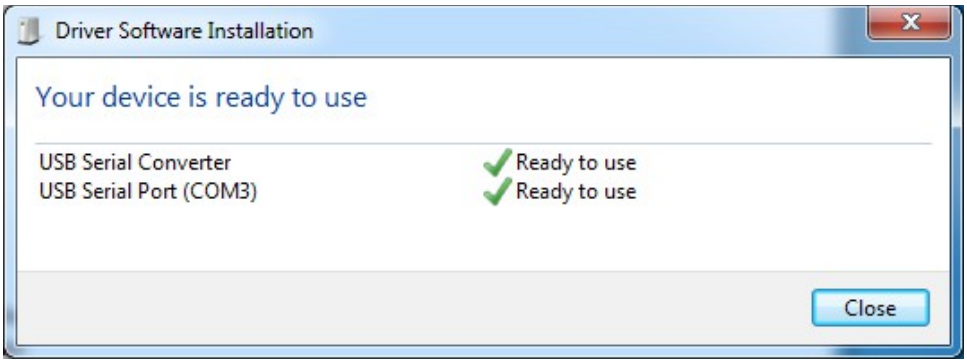
When connecting the QC Box USB cable the system start searching for a driver.



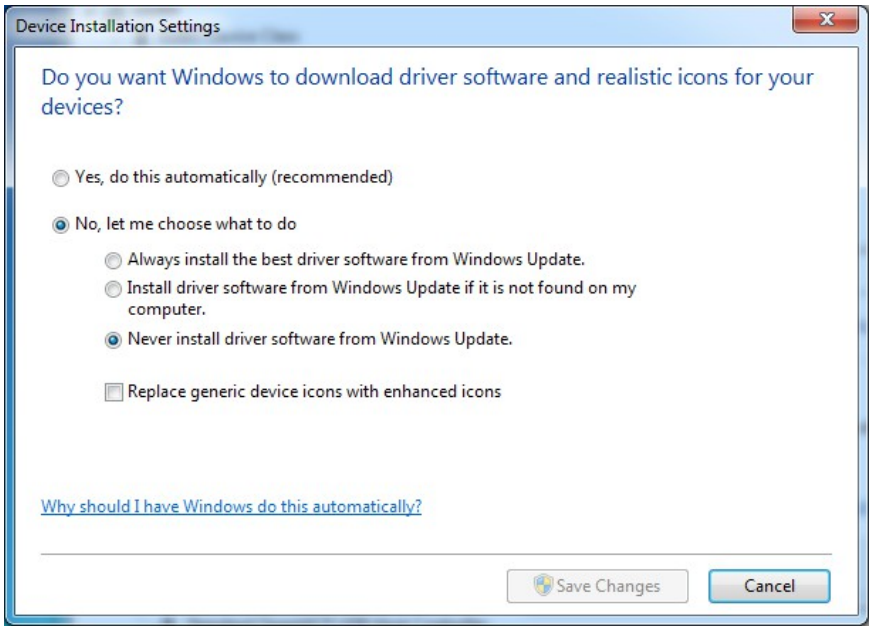
If the "Device Installation Settings" of the system are set to download the driver from the Windows Update service and if an Internet connection is active, the driver is

automatically downloaded and installed.

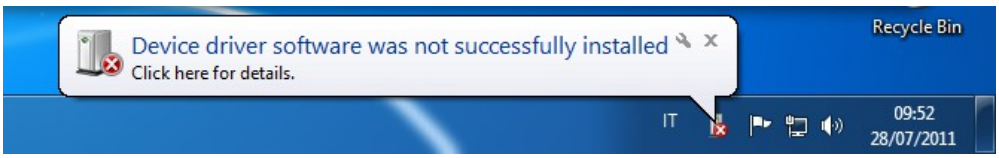

Driver Software Installation
Installing device driver software
FT232R USB UART
Searching Windows Update...
Obtaining device driver software from Windows Update might take a while.
Skip obtaining driver software from Windows Update
Close



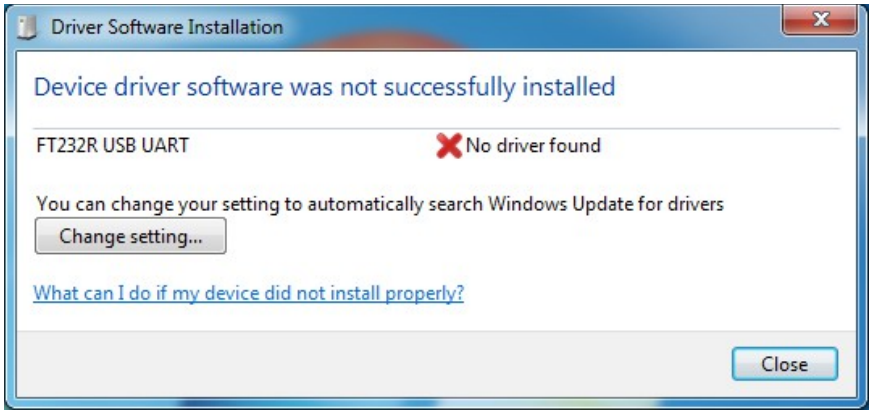
By default "Device Installation Settings" are set to "Never install driver software from Windows Update":


Device Installation Settings
Do you want Windows to download driver software and realistic icons for your devices?
Yes, do this automatically (recommended)
No, let me choose what to do
Always install the best driver software from Windows Update.
Install driver software from Windows Update if it is not found on my computer.
Never install driver software from Windows Update.
Replace generic device icons with enhanced icons
Why should I have Windows do this automatically?
Save Changes
Cancel

In this case the system fail to find a driver, and a message will appear:



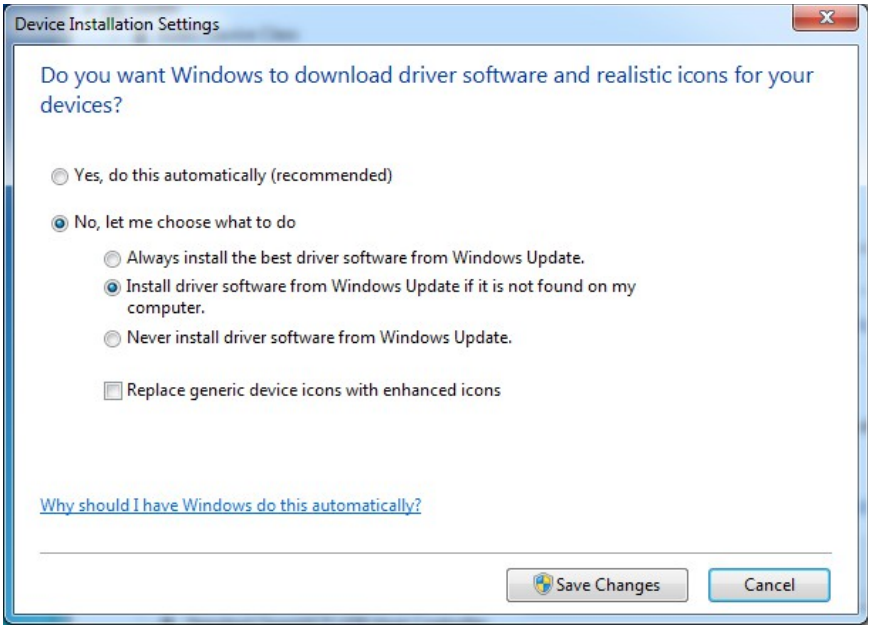
Clicking on "Click here for details" open a new window:


Driver Software Installation
Device driver software was not successfully installed
FT232R USB UART
No driver found
You can change your setting to automatically search Windows Update for drivers
Change setting...
What can I do if my device did not install properly?
Close

In this case there are two methods to install the driver for the QC BOX.

Windows Update:

It is possible to change the "Device Installation Settings" by selecting "Install driver software from Windows Update if it is not found on my computer" and saving changes.

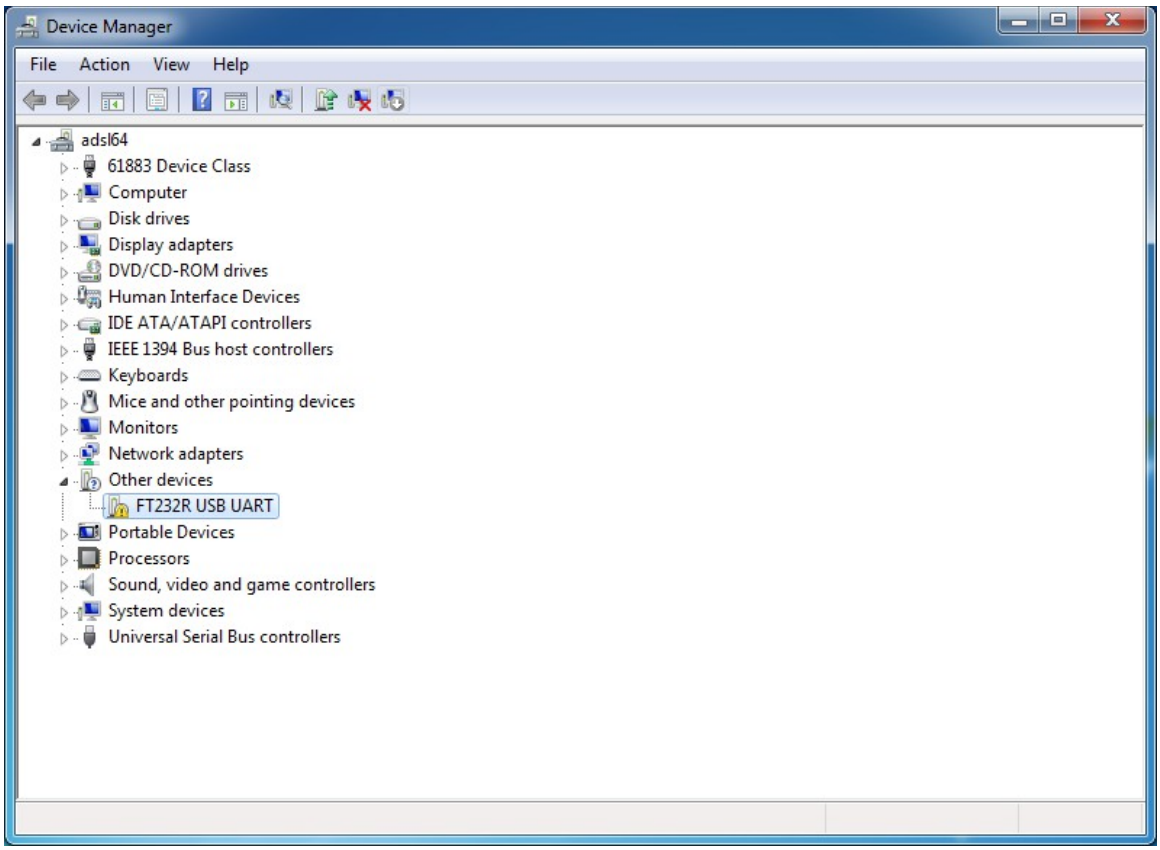

Device Installation Settings
Do you want Windows to download driver software and realistic icons for your devices?
Yes, do this automatically (recommended)
No, let me choose what to do
Always install the best driver software from Windows Update.
Install driver software from Windows Update if it is not found on my computer.
Never install driver software from Windows Update.
Replace generic device icons with enhanced icons
Why should I have Windows do this automatically?
Save Changes
Cancel

Then disconnect and reconnect the QC BOX USB cable. At this point the driver should be automatically downloaded from Windows Update.

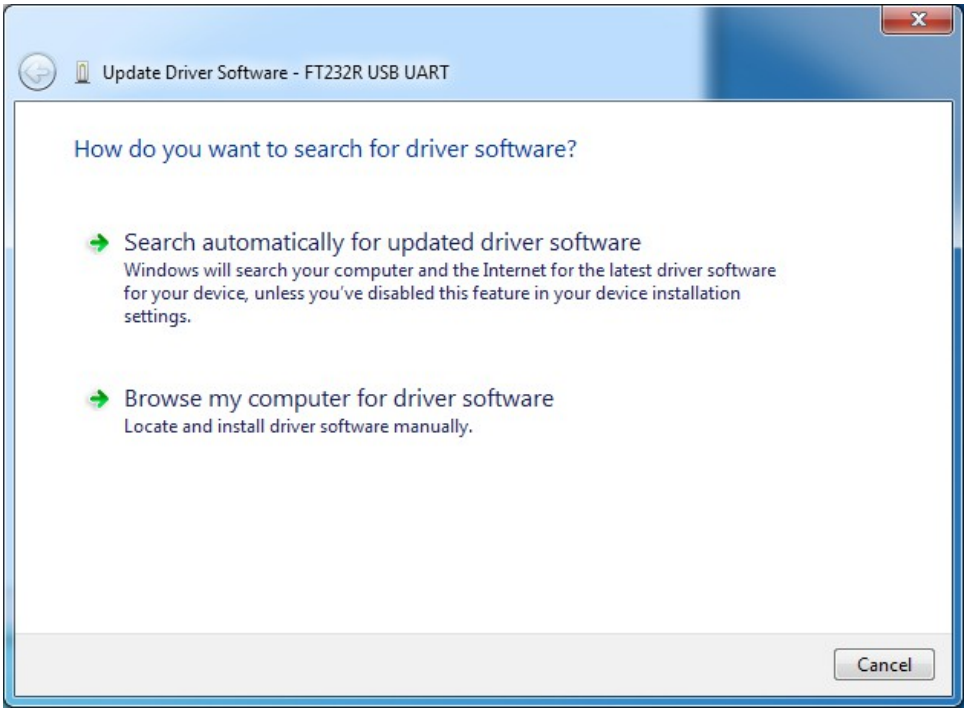
Manual Installation:

If the driver is not found, it is possible to manually install device drivers supplied with the QC BOX CD.

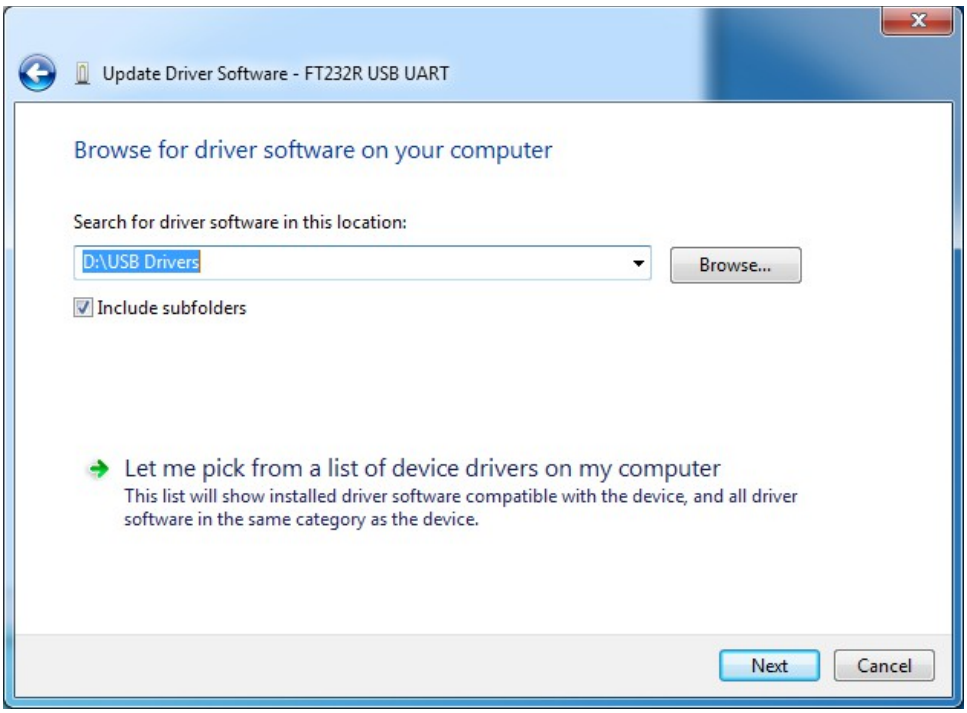
In the Device Manager window there will be a FT232R USB UART device under Other Devices with a yellow warning symbol to indicate that the driver is not installed.



Right click on the device and select "Update Driver Software", this then displays the option for an automatic search or a manual search.


Update Driver Software - FT232R USB UART
How do you want to search for driver software?
Search automatically for updated driver software
Windows will search your computer and the Internet for the latest driver software for your device, unless you've disabled this feature in your device installation settings.
Browse my computer for driver software
Locate and install driver software manually.
Cancel

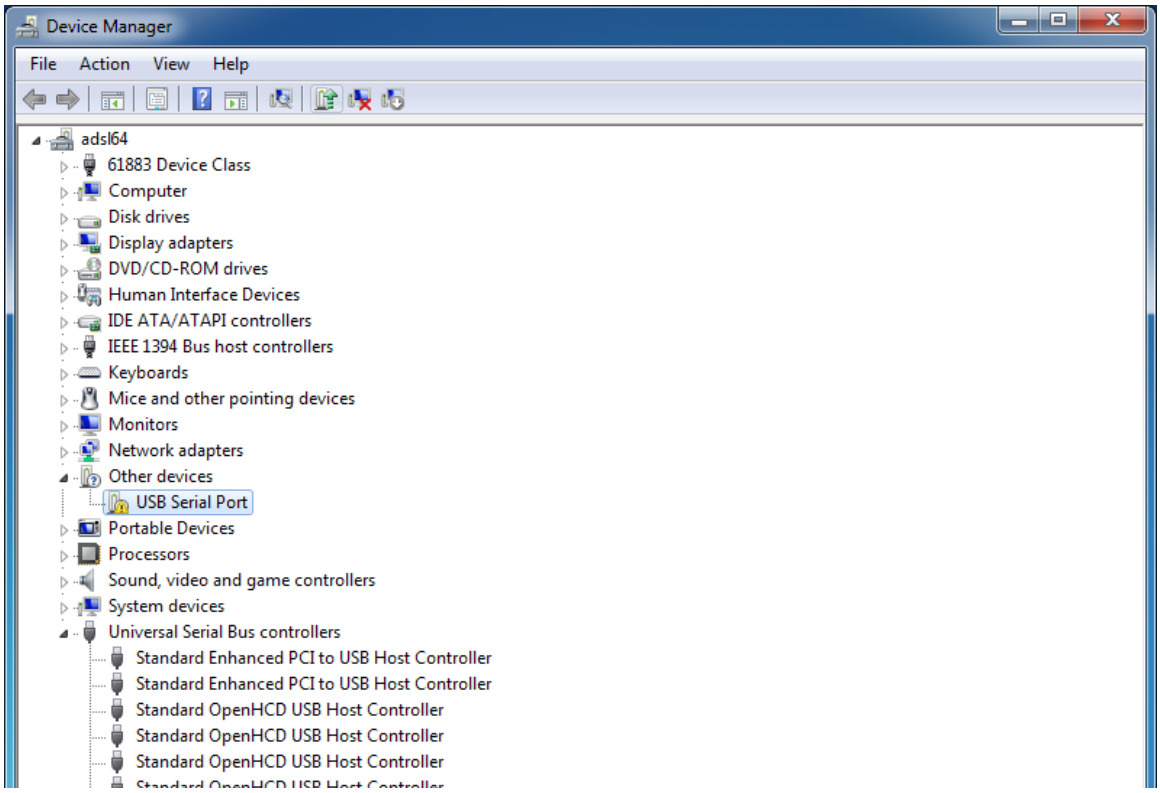
Select the second option to browse manually. Insert the QC BOX CD and select the "USB Drivers" folder.


Update Driver Software - FT232R USB UART
Browse for driver software on your computer
Search for driver software in this location:
D:\USB Drivers
Browse...
Include subfolders
Let me pick from a list of device drivers on my computer
This list will show installed driver software compatible with the device, and all driver software in the same category as the device.
Next
Cancel

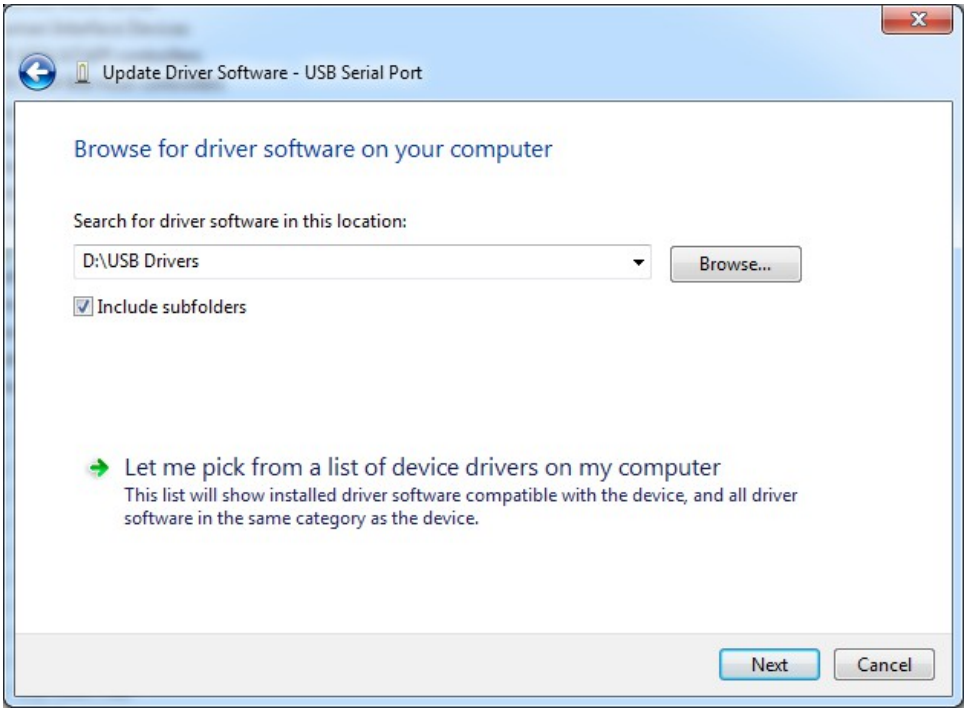
Select "NEXT" to start the installation:

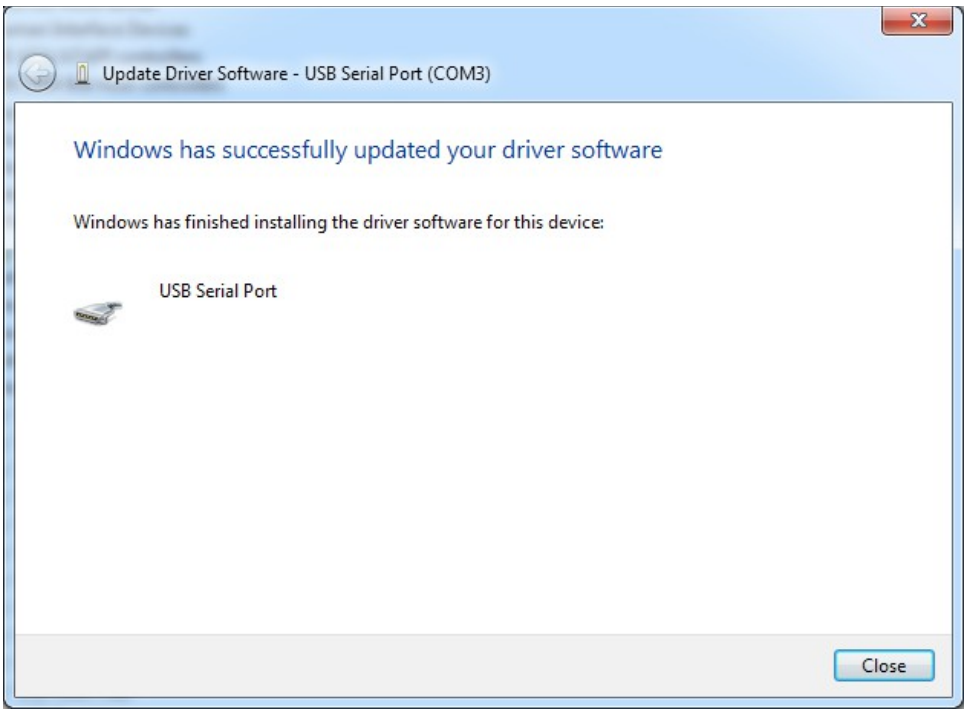
Update Driver Software - USB Serial Converter
Windows has successfully updated your driver software
Windows has finished installing the driver software for this device:
USB Serial Converter
Close

At this point in the Device Manager you should have a situation like the one in the following screenshot.



Right click on the "USB Serial Port" device and select again "Update Driver Software", follow the same procedure as before.

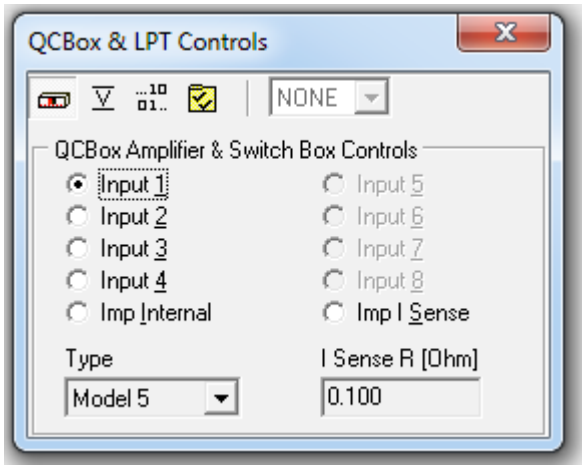

Update Driver Software - USB Serial Port
Browse for driver software on your computer
Search for driver software in this location:
D:\USB Drivers
Browse...
Include subfolders
Let me pick from a list of device drivers on my computer
This list will show installed driver software compatible with the device, and all driver software in the same category as the device.
Next
Cancel


Update Driver Software - USB Serial Port (COM3)
Windows has successfully updated your driver software
Windows has finished installing the driver software for this device:
USB Serial Port
Close

8 - SOFTWARE CONTROL

It is possible to control the QCBOX MODEL 5 from CLIO 8, CLIO 10 and CLIO 11 software.

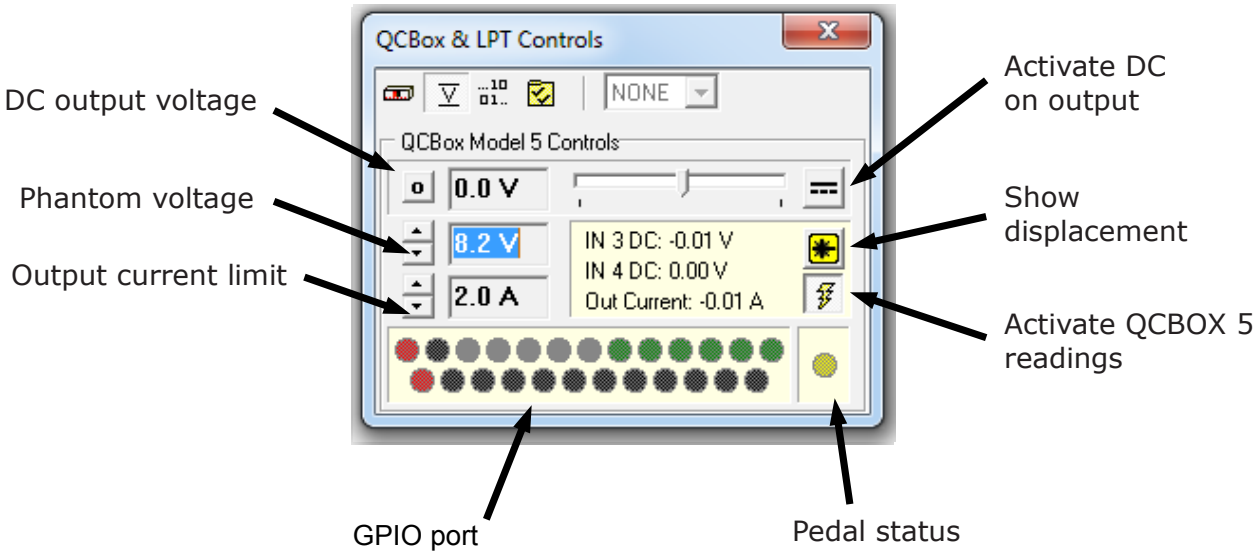
Run CLIO 10, then click on the External Hardware Button (or simply press **Shift-F4**).



Choose Model 5 in the 'Type' drop down. The control should be active; an acoustic confirmation should come from the internal relays, you should hear them clicking when changing inputs.

Please refer to the CLIO User's Manual for executing frequency response and impedance measurements.

Pressing the ⩛ button gives access to the QCBOX MODEL 5 advanced features:



Using this panel is possible to choose the DC output voltage, the phantom voltage, the output current limiter. The GPIO port can be wrote simply by clicking on the output bits.

9 - CALIBRATING SOFTWARE

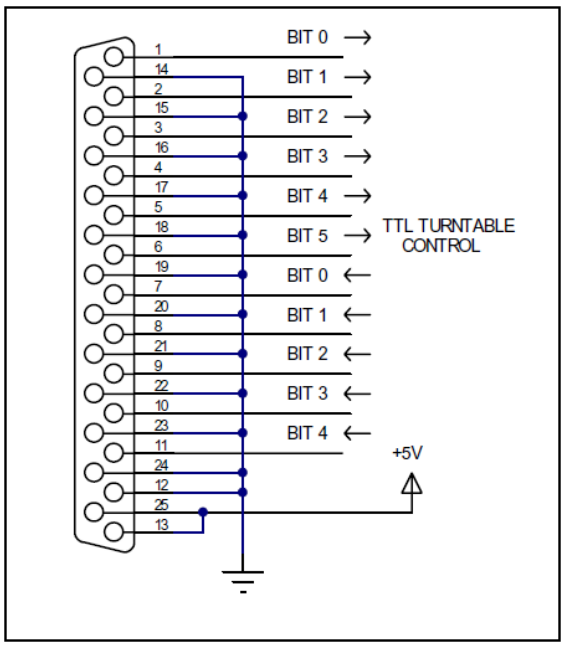
It is possible to calibrate the CLIO 10 software to obtain maximum precision when executing current sensing measurement. The calibration relies on the input of the correct sensing resistor value (**I Sense R**) in the External Hardware panel.
Inside the unit there is a sensing resistor of nominal value of 0.1 Ohm; as it is rather difficult to maintain such a low value under strict production control the software allows for the input of its value. The calibration relies on an impedance measurement of a precision resistor of known value.

Please enter the value of 0.1 Ohm; this will give you reasonable precision during measurements even in absence of the calibration described hereafter.

If you want to proceed with the calibration:
1) Take a resistor of known value (in the range 10 to 22 Ohm); assume, for example, a known resistor of 10 Ohm
2) Connect the resisitor directly to the output (D.U.T.) socket of the QCBox (don't use connecting cables)
3) Simply perform an impedance measurement (refer to chapter 13 of CLIOwin User's Manual)
4) Read the value of its modulus at 1kHz; assume you read 9.5 Ohm
5) Multiply 0.1 by 1.05 (10/9.5) to obtain 0.105
6) Input this new value
7) Verify calibration with a new impedance measurement

10 - CONNECTING EXTERNAL HARDWARE

The DB25 connector can be used to interface the QCBOX Model 5 with external hardware, the connection are as showed in the following figure:



If you connect the unit to external signals be sure to use TTL logic levels.

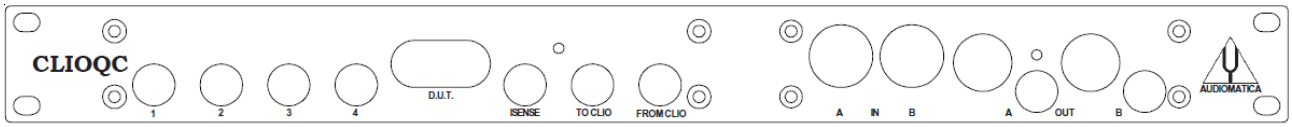
11 - CONNECTING A FOOT PEDAL SWITCH

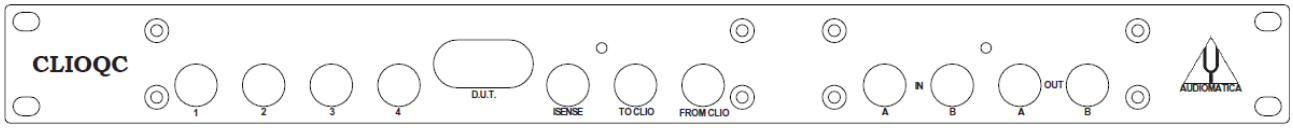
It is possible to connect an external foot pedal switch to the **PEDAL IN** input on the rear panel of the QCBox Model 5.

This will trigger QC operations as described in chapter 14 of the CLIO User's Manual.

12 - RACK MOUNT ASSEMBLY

Using the Rack QC panel it is possible to assemble the QCBOX Model 5 together the FW-01 Audio Interface or the SC-02 Signal Conditioner so that they can be mounted in a standard 19” rack frame.





13 - INTERNAL SETTINGS AND TROUBLESHOOTING

If you want to make one of the possible internal settings **disconnect the unit from the mains power** and then carefully open the unit; locate SW2 from the figure below and make the appropriate selection. It is possible, using the dip switch SW2, to select a phantom power supply on each input separately. When a switch is ON the phantom power is present at that input.

Jumper J17 - If present input 3 is DC coupled

Jumper J18 - If present input 4 is DC coupled

Jumper J21 - If present the power amplifier input is DC coupled

Default factory settings are phantom power on inputs 1 and 2, input 3 and 4 DC coupled and power amplifier AC coupled (J21 not present).